

BBC[Home](#)[News](#)[Sport](#)[Weather](#)[Shop](#)[Earth](#)[Travel](#)[Home](#)[Video](#)[World](#)[US & Canada](#)[UK](#)[Business](#)[Tech](#)[Science](#)

Science & Environment

Geo-engineering: Climate fixes 'could harm billions'

By David Shukman

Science editor, BBC News

26 November 2014



Schemes to tackle climate change could prove disastrous for billions of people, but might be required for the good of the planet, scientists say.

That is the conclusion of a new set of studies into what's become known as geo-engineering.

This is the so far unproven science of intervening in the climate to bring down temperatures.

These projects work by, for example, shading the Earth from the Sun or soaking up carbon dioxide.

Ideas include aircraft spraying out sulphur particles at high altitude to mimic the cooling effect of volcanoes or using artificial "trees" to absorb CO₂.

Long regarded as the most bizarre of all solutions for global warming, ideas for geo-engineering have come in for more scrutiny in recent years as international efforts to limit carbon emissions have failed.

Now three combined research projects, led by teams from the universities of Leeds, Bristol and Oxford, have explored the implications in more detail.

The central conclusion, according to Dr Matt Watson of Bristol University, is that the issues surrounding geo-engineering - how it might work, the effects it might have and the potential downsides - are "really really complicated".

Sun block



"We don't like the idea but we're more convinced than ever that we have to research it," he said.

"Personally I find this stuff terrifying but we have to compare it to doing nothing, to business-as-usual leading us to a world with a 4C rise."

The studies used computer models to simulate the possible implications of different technologies - with a major focus on ideas for making the deserts, seas and clouds more reflective so that incoming solar radiation does not reach the surface.

One simulation imagined sea-going vessels spraying dense plumes of particles into the air to try to alter the clouds. But the model found that this would be far less effective than once thought.

Another explored the option of injecting sulphate aerosols into the air above the Arctic in an effort to reverse the decline of sea-ice.

A key finding was that none of the simulations managed to keep the world's temperature at the level experienced between 1986-2005 - suggesting that any effort would have to be maintained for years.

More alarming for the researchers were the potential implications for rainfall patterns.

Although all the simulations showed that blocking the Sun's rays - or solar radiation management, as it is called - did reduce the global temperature, the models revealed profound changes to precipitation including disrupting the Indian Monsoon.



Prof Piers Forster of Leeds University said: "We have found that between 1.2 and 4.1 billion people could be adversely affected by changes in rainfall patterns.

"The most striking example of a downside would be the complete drying-out of the Sahel region of Africa - that would be very difficult to adapt to for those substantial populations - and that happens across all the scenarios."

Despite the risk of catastrophic side-effects from geo-engineering, the study authors believe that research should continue just in case runaway warming leaves no other options.

Prof Forster said: "If we were in a really desperate situation, trying to cool the temps for a 10-20 year time period, there could be some merit in those circumstances in introducing solar radiation management to give you a 10-20 year time period."

Lack of knowledge



According to Prof Steve Rayner of Oxford University, it is easier to devise the technology than to understand its effects or how its use should be governed.

"If you were just thinking of the capability of putting sulphate aerosols in the atmosphere, that you could do in less than two decades - whether you would know it was smart to do it in less than two decades is another question.

"We don't know enough - we have a few islands of knowledge in a sea of ignorance and it's absolutely worth knowing more. There is the potential that some of these technologies may be part of a broader tool kit of ways in which we can better manage climate change.

"People decry solar radiation management as a band-aid but band-aids can be useful for healing."

Geo-engineering has long been one of the most controversial aspects of the debate about solutions to climate change and few experiments have been conducted in the field.

One of the largest, known as Lohafex, was an Indian-German experiment in 2009 which involved dumping six tonnes of an iron solution into the South Atlantic to encourage plankton to bloom - trapping carbon which would then be sent to the seabed when the organisms died. Results showed limited success.

Another proposal for the trial flight of a balloon in Britain, as part of geo-engineering research for the SPICE project, attracted stiff opposition from environmental groups and was cancelled.

It would have been the precursor to a test of a technique for pumping sulphate aerosols into the atmosphere in an effort to bounce solar radiation back into space and cool the planet.

Related Topics

Climate change

Share this story About sharing

More on this story

Geoengineering plan could have 'unintended' side effect

8 January 2014

Are ideas to cool the planet realistic?

20 September 2013

Geoengineering: Risks and benefits

24 August 2012

Science & Environment



1,600 skilled workers denied UK visas

16 May 2018 | [Science & Environment](#)



Delay for Bloodhound high-speed trials

16 May 2018 | Science & Environment



How the 'chickens from hell' nested

16 May 2018 | [Science & Environment](#)

Top Stories

N Korea threatens to cancel Trump summit

Pyongyang attacks US "provocation" and says it will not be forced to give up its nuclear weapons.

1 hour ago

Body clock linked to mood disorders

1 hour ago

Japan sputters as growth streak ends

3 hours ago

Features



'Meghan had a certain sparkle'

The royal bride's former teachers and first boyfriend recall her as a brave and passionate teen.



Would you pay your ex a 'break-up fee'?



Is US faith really rising under Trump?

A decade ago, 65% of Americans identified as white Christians. Now, that number has decreased to 43%.



A social media star... in North Korea



How tech took the bite out of France's rail strikes



Why Narendra Modi remains the BJP's star vote-catcher



Life in the Gaza Strip explained



The Ghanaian shoe seller taking on an ex-dictator



'My lovely dad tried to kill me'

Most Read

Anne Frank's 'dirty jokes' found in hidden diary pages	1
North Korea threatens to cancel Trump summit	2
Govia Thameslink changes time of every train in shake-up	3
'My lovely dad tried to kill me'	4
Body clock linked to mood disorders	5
Carillion bosses drove construction firm off a cliff, say MPs	6
Criminal charges fall despite rise in recorded crime - check your police force	7
Royal wedding: Surgery may stop Meghan's father attending	8
1,600 IT workers and engineers denied UK visas	9
Farnese Blue diamond fetches \$6.7m at Geneva auction	10

**Why you can trust BBC News**

BBC News Services

On your mobile

On your connected tv

Get news alerts

Contact BBC News

Explore the BBC

Home

Sport

Shop

Travel

Culture

Future

Radio

CBeebies

iWonder

Music

Make It Digital

Nature

News

Weather

Earth

Capital

Autos

TV

CBBC

Food

Bitesize

Arts

Taster

Local

Terms of Use

About the BBC

Privacy Policy

Cookies

[Accessibility Help](#)

[Parental Guidance](#)

[Contact the BBC](#)

[Get Personalised Newsletters](#)

[Advertise with us](#)

[Ad choices](#)

Copyright © 2018 BBC. The BBC is not responsible for the content of external sites. **Read about our approach to external linking.**